

### ABSTRACT

The present invention is directed to hematopoietic progenitor cells isolated from a tissue specimen, such as marrow cells or peripheral blood, and to the method of co-culturing isolated hematopoietic progenitor cells with human mesenchymal stem cells to induce megakaryocyte  
5 differentiation and platelet production. In addition, hematopoietic stem cells can be genetically engineered to carry genes of interest particularly for the expression of physiologically active proteins. In the presence of mesenchymal stem cells, the transduced cells carry the new genetic material and express gene products that can be used to modulate blood disorders.